

(p. 77), will be found worthy of careful consideration.

To those who have been so long hoping that some day the importance of science in connection with industry would be recognised by the State, the Government scheme for industrial research is a source of satisfaction. The department now established has made a good beginning in affording assistance to many workers from the fund of one million granted by the Government and in encouraging the formation of research associations among manufacturers. Many of these are already in operation and are enumerated, with the names of their officers, in the comprehensive volume under notice.

THE BIRDS OF COLOMBIA.

Bulletin of the American Museum of Natural History. Vol. xxxvi., 1917. *The Distribution of Bird-Life in Colombia: A Contribution to a Biological Survey of South America.* By Dr. Frank M. Chapman. Pp. x+729+xli plates. (New York: The American Museum of Natural History, 1917.)

DR. CHAPMAN'S "Report on the Distribution of Bird-Life in Colombia" ranks amongst the most important contributions ever made to the knowledge of the ornithology of the Neotropical Region, the avifauna of which stands unrivalled both in the wealth and variety of its feathered forms and in the number of its peculiar family and generic types. Colombia, thanks to Dr. Chapman's investigations, is now known to be the richest portion of this remarkable area so far as bird-life is concerned. That this should be so is due, no doubt, to the varied physiographical features to be found in that equatorial republic, for these range from tropical pasture-lands and forests at low, or comparatively low, levels to regions of perpetual snow in the Cordilleras, and include the uppermost tributaries of the Orinoco and some of those of the Amazon.

In the year 1910 the American Museum of Natural History organised and commenced a series of expeditions for the systematic exploration of the bird-life of the republic. These extended over five years, and were carried out under the direction of Dr. Chapman, who himself took part in them in 1910 and again in 1913. As the result of these systematic and well-organised explorations, 15,775 specimens, representing 1285 forms (species and subspecies), were obtained. Hence the report is based not only upon scientifically collected data, but also upon intimate personal knowledge of the country and its birds on the part of its author—a combination which has rendered the work of inestimable value.

As the result of his studies on this ideal system, Dr. Chapman recognises the following vertical life-zones: A tropical, which ranges up to 4500–6000 ft.; a sub-tropical, from 4500–6000 ft. to 9000–9500 ft.; a temperate, from 9000–9500 ft. to 11,000–13,000 ft.; a paramo (high plateau),

from 11,000–13,000 ft. to the snow-line at 15,000 ft. These zones he again subdivides into faunal areas, so that the distribution of bird-life in Colombia is worked in remarkable detail. The author tells us that the uniformity of life increases with altitude, and that the distinctness of the various animals and plants of these several zones was a constant source of surprise and joy to him.

It is quite impossible here to enter into details of the various distributional problems unfolded by the author, but the portions of the work devoted to them are the most interesting and valuable to be found in this great work.

The systematic portion of the report treats in detail of the distribution, plumage, haunts, habits, etc., of the 1285 forms of bird-life which constitute the ornithology of Colombia. Of these, twenty-two species and 115 subspecies are new to science. It is much to be regretted that Dr. Chapman has not included in his report the birds, some 400 in number, which had previously been recorded, but did not come under the notice of himself or his explorers. If this had been done it would have rendered his volume a complete record of all that is known to date of the avifauna of Colombia.

The volume is enriched by a series of reproductions of photographs of scenery depicting the various life-zones, and of useful maps and charts illustrating the distribution of species, forests, etc. It is further embellished by four coloured plates, devoted to the newly discovered birds, by the well-known zoological artist, Louis Agassiz Fuertes, who accompanied Dr. Chapman on two of his expeditions.

The author is to be heartily congratulated on the completion of his admirable work and on the masterly manner in which he has presented its results. Congratulations are also due to that enlightened institution, the American Museum of Natural History, which made this grand undertaking possible.

W. E. C.

OUR BOOKSHELF.

Practical Physiological Chemistry. A Book Designed for Use in Courses in Practical Physiological Chemistry in Schools of Medicine and of Science. By Prof. Philip B. Hawk. Sixth edition, revised and enlarged. Pp. xiv+661+vi plates. (London: J. and A. Churchill, 1919.) Price 21s. net.

THIS book, written by one of the best known of American physiological chemists, first appeared in 1907. Its success is evident from the fact that it is now in its sixth edition, and is due to the clearness and completeness of the practical instructions with which it is packed. It does not pretend to be a complete work of reference, but, though designed for the use of students, it is far too exhaustive for the ordinary student of medicine, who in the few years of his curriculum has to learn so many other subjects, and it is difficult to imagine that the American student can devote

more time to physiological chemistry, important as the subject is, than his brother in this country.

The book labours from the disadvantage under which all books which see many editions labour; no one is more acutely conscious of this than the present reviewer; it is so easy to add, so heart-breaking to excise. At the same time, Prof. Hawk has made a praiseworthy attempt to cut down the multiplicity of methods which assail him. For example, the only methods given for urea estimation are those based on the use of urease, and Van Slyke's procedure is the only one described for the determination of acetone bodies. The same ruthless use of the pruning-knife in relation to other materials (*e.g.* sugar) would add to the practical usefulness of a most admirable book.

It would be easy to criticise details; for example, the book starts with a study of the most difficult of all chemical problems, namely, enzymes, so that it is scarcely one to recommend to the beginner; then, too, it is not always up to date; for instance, we are told that English physiologists speak of metaproteins as infraproteins, a term they dropped many years ago; the account of muscle physiology does not appraise the work of Hopkins and Fletcher on lactic acid (probably the key to the whole situation) at its full value. But where so much is good, picking holes is neither profitable nor kind.

W. D. H.

Joseph Priestley. By D. H. Peacock. (Pioneers of Progress. Men of Science.) Pp. 63. (London: Society for Promoting Christian Knowledge; New York: The Macmillan Co., 1919.) Price 2s. net.

THE story of Priestley's life has been told and retold; but to the man of science it is always an attractive story, and to the general reader its appeal is perhaps scarcely less strong. To the chemist there is a never-failing interest in reading how this village minister, theological controversialist, and political reformer, who had no special scientific training and no particular facilities for experimentation, nevertheless was drawn to chemical studies, and acquired a just and lasting fame by his brilliant discoveries.

Priestley's mind was one of rare alertness, and if he missed many things through the weakness of his theoretical deductions, a remark of his biographer helps us to understand pretty clearly why this was so. "Chemistry was really little more than a hobby to him; theology was his life work. . . . Priestley was Priestley, not Cavendish."

Of this notable "pioneer" we get a good picture in Mr. Peacock's pages. There are only about sixty of these, but they suffice to tell pleasantly, even if briefly, of Priestley's early struggles, his prolific pugnacity in pamphleteering, his delight in experiments, his serenity under adversity, his pathetic exile, and his peaceful passing.

C. SIMMONDS.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

A Darwinian Statement of the Mendelian Theory.

So far as the present writer knows, no public notice has yet been given to a series of statements by Darwin in his "Animals and Plants under Domestication" that constitute virtually a statement of the Mendelian theory of the distribution and recombination of factors in hybrid offspring. Darwin's idea of dissociation is, of course, founded on Naudin's conception of disjunction; but the remainder of his theory is as original as Mendel's, except that it is purely speculative instead of being derived directly from experimental data. It is worked out, as a matter of fact, by means of his theory of pangenesis.

Darwin begins as follows:—"Another form of reversion is far commoner, indeed is almost universal with the offspring from a cross, namely, to the characters proper to either pure parent-form. As a general rule, crossed offspring in the first generation are nearly intermediate between their parents, but the grandchildren and succeeding generations continually revert, in a greater or lesser degree, to one or both of their progenitors" (vol. ii., p. 22).

He then quotes Naudin's view that "a hybrid is a living mosaic-work, in which the eye cannot distinguish the discordant elements, so completely are they intermingled. We can hardly doubt that, in a certain sense, this is true, as when we behold in a hybrid the elements of both species segregating themselves into segments in the same flower or fruit by a process of self-attraction or self-affinity, this segregation taking place either by seminal or bud-propagation" (p. 23).

Darwin goes on to comment on Naudin's view that the segregation of the male and female elements would be most likely to occur in the reproductive cells, since in this way their reunion through the fusion of pollen-grains and ovules would explain the phenomenon of reversion.

He then says:—

"If . . . pollen which included the elements of one species happened to unite with ovules including the elements of the other species, the intermediate or hybrid state would still be retained, and there would be no reversion" (p. 23).

Here is a statement of a theory of heterozygosis which, although not complete in exactly Mendelian form, is, so far as the writer knows, the first before the appearance of Mendel's paper. Darwin's more elaborate explanation comes later. He continues:—

"But it would, I suspect, be more correct to say that the elements of both parent-species exist in every hybrid in a double state, namely, blended together and completely separate" (p. 23).

Finally, in his chapter on pangenesis, Darwin approaches the theory of hybrids in thorough-going fashion, driving his pangenesis theory to its legitimate conclusions. By this theory, as is well known, it was assumed that the character-units existed in the somatic cells in the form of physical entities, however small, known as "gemmules." These, passing into the reproductive cells, conveyed thither the sum-total of the inheritance.

Darwin then approaches the subject of the theory of hybrids as follows:—

"The tendency to reversion is often induced by a change of conditions, and in the plainest manner by crossing. Crossed forms of the first generation are